REMARKS

Reconsideration of the present application is respectfully requested. Claims 1-52 were pending. Claims 1, 41, and 43 have been amended without adding any new matter. Claims 11 and 24 have been cancelled. No claims have been added. Thus, claims 1-10, 12-23, and 25-52 remain pending.

The Examiner rejected claims 1, 2, 5-7, 12, 13, 15-21, 24, 29-34, 38-39, 41-42, 45-47, and 52 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,463,177 (hereinafter "Li") in view of U.S. Patent No. 6,020,920 (hereinafter "Anderson1"). The Applicants respectfully disagree.

Li describes dynamically changing the size of compressed images based on the number of images stored in a camera (Li, column 1, lines 40-47). The size of stored images are reduced by truncating the least significant portions of the images' bitstreams in order to make room for a newly captured image (Li, column 2, line 60 to column 3, line14). Thus, the system dynamically changes the compression ratio of an image by simply deleting the least significant portion of an image's bitstream.

Anderson1 describes a method and system for displaying pictures on an image capture device's graphical user interface (Anderson1, column 2, lines 35-54). Images are organized within speculation buffers based on a scrolling method of a user and displayed on the graphical user interface (Anderson1, column 2, lines 35-54). The system described by Anderson1 includes a DRAM for storing images utilized by the speculation buffers (Anderson1, Column 4, lines 34-43).

Claim 41, as amended, recites:

A digital camera device, that supports a multithreaded execution

environment, with improved latency time between acquiring pictures, the device comprising:

an image buffer to store digital images;

a user-activated button, integrated into the digital camera device, for generating a user request to capture a sequence of digital images at the digital camera device, said sequence of digital images being stored in the image buffer upon capture;

a first compression module, embodied within the digital camera device, for temporarily compressing, with a relatively fast compression technique, at least some of the digital images from the sequence of digital images upon capture, thereby freeing up available storage in said image buffer, wherein the temporarily compressing at least some of the digital images operates as a high-priority thread in the multithreaded execution environment;

a buffer to store a temporarily compressed image;

a decompression module, embodied within the digital camera device, for decompressing the digital images that were temporarily compressed, and to defer said decompressing of the digital images until high priority tasks in the high-priority thread have been processed by the digital camera device; and

a second compression module, embodied within the digital camera device, for compressing the decompressed digital images that were temporarily compressed more thoroughly than that provided by said first compression module, prior to storing the image in a non-volatile memory.

That is, claim 41 includes a multi-threaded camera device with a first compression module for temporarily compressing digital images, with a relatively fast compression technique, as a high-priority thread in the multithreaded execution environment of the camera device. Decompression of the temporarily compressed images is deferred until the high-priority tasks have been completed. Then the temporarily compressed images are decompressed and more-thoroughly recompressed prior to storing the image in a non-volatile memory. The result of the prioritized compression processes of the compression modules is an improved allocation/preservation of camera resources while preserving the quality of images upon ultimate storage.

Anderson1, as discussed above, provides for speculative decompression based on user scrolling. Anderson1, however, fails to describe or suggest various compression techniques operating on prioritized threads.

Further, Li discusses a dynamic image storage scheme for truncating bitstreams in order to make room in storage for new pictures. Li explicitly recites:

> A user, therefore, has the option to take fewer high quality images with little or no truncation (memory configuration 12A) or more lower quality images with a higher compression ratio (memory configurations 12B or 12C). Because the images #1, #2 and #3 are encoded into embedded bitstreams, each image can be arbitrarily truncated at the end to make room for additional images. To change compression ratios using other compression techniques, the stored images would first have to be decoded, then requantized and then reencoded at the higher compression ratio. The recompressed images would then have to be restored into memory 12. The embedded encoding technique described above allows less complex memory management system to dynamically allocate memory for new images. (Li, column 3, lines 1-14)

As explicitly recited in Li, compression ratio may be changed with "other techniques," but not the embedded encoding technique of Li. Although Li makes mention of reencoding images at different compression ratios, the reencoding is performed by the "other techniques," and not the methods and systems taught by Li. Consequently, Li must fail to disclose whether the reencoding occurs in a digital camera, when it occurs, or what triggers the reencoding. Thus, Li fails to describe the various prioritized compression techniques performed by the first and second compression modules, as claimed by the applicants.

The Examiner asserts that Li discloses "a second compression module for compressing the decompressed digital image that were compressed more thoroughly than that provided by the first compression module" (Final Office Action, mailed

September 19, 2006, Page 2). As noted above, Li mentions the "other techniques" to contrast the dynamic embedded coding technique which is the subject of Li. The Applicants, however, are unable to locate where Li includes the "other techniques" within the camera device or how the other techniques function with the embedded coding technique. As such, the Applicants respectfully submit that Li fails to describe whether or not the other techniques are included in the camera device, when the other techniques occur, or how the other techniques are triggered.

Therefore, Anderson1 and Li, taken alone or in combination fail to render claim 41 obvious under § 103.

The Applicants have amended claim 41 to include limitations, similar to those that were rejected under a combination of Li, Anderson1, and U.S. Patent No. 5,790,878 (hereinafter "Anderson2") (Final Office Action, page 10, paragraph 5). The Examiner cited Anderson2 to provide for digital cameras that include multi-threaded environments (Final Office Action, mailed 9/19/06 page 10 *citing* Anderson2, column 1, lines 25-35). The passage within Anderson2 that refers to multi-threaded software environments Anderson states:

> Modern photographic technology presently features a variety of digital camera devices which capture image data by electronically scanning selected target objects. Digital camera devices typically process and compress the captured image data before storing the processed image data into internal or external memory devices. Furthermore, these digital camera devices may utilize multiple software routines running within a multi-threading environment to perform the various steps of capturing, processing, compressing and storing the image data. (Anderson 2, column 1, lines 25-35).

Thus, Anderson2 merely describes that modern photographic technology includes digital camera's that may utilizes multi-threading environments, without regard to

compression, recompression, what triggers various compression processing, etc. As Anderson2 is directed to systems and methods for recovering from a power failure in a digital camera, Anderson2 is completely silent as to thread priorities, how those various priorities impact the execution of the threads, and how various compression techniques are handled within prioritized threads.

Because the Examiner admitted that Li and Anderson1 fail to describe or suggest multi-threaded systems, Li and Anderson1 must therefore fail to describe or suggest including various compression modules within differing priority threads in multithreaded execution environment of digital camera. Furthermore, because Anderson2, as discussed above, also fails to describe or suggest the noted limitations, a combination of Li, Anderson1, and Anderson2 also fail to render claim 41 obvious under 35 U.S.C. § 103(a).

Thus, the combination of Li and Anderson1 fail to render obvious claim 41 along with its dependent claims. Furthermore, a combination of Li, Anderson1, and Anderson2 would also fail to render claim 41 obvious. The Applicants respectfully request withdrawal of the rejections under § 103.

Claim 1, as amended, recites:

> A method for compressing digital images upon capture at a digital camera device, the method comprising:
> receiving user input requesting capture of a sequence of digital images at the digital camera device, said digital images being stored in an image buffer;
> applying a relatively-fast compression technique to temporarily compress a subset of the digital images upon capture, so as to increase availability of storage in said image buffer for storing other digital images being capture, wherein said digital camera device supports multithreaded execution and wherein said step of applying the relatively-fast compression technique occurs as a high-priority thread;
> deferring decompression of the subset of the digital images until the

digital camera device has processed high-priority tasks in the high-priority thread;

decompressing the subset of the digital images that were temporarily compressed; and thereafter

applying a relatively-thorough compression technique to the decompressed subset of the digital images wherein said steps of decompressing and applying a relatively-thorough compression technique occur once the digital camera device has processed the high-priority tasks.

As discussed above, with respect to claim 41, neither Li nor Anderson1, alone or in combination, teach or suggest different compression techniques operating on prioritized threads in a digital camera device that supports a multi-threaded execution environment. Therefore, since neither reference, alone or in combination, teaches or suggests different compression techniques operating on prioritized threads in a digital camera device that supports a multi-threaded execution environment, claim 1 and its dependent claims are also not rendered obvious by Li in view of Anderson1.

The Examiner rejected claims 3-4, 11, 43-44 under 35 U.S.C. § 103(a) as being unpatentable over Li in view of Anderson1, and further in view of U.S. Patent No. 5,790,878 (hereinafter "Anderson2").

Anderson2 discloses a "system and method for recovering from a power failure in a digital camera comprises a power manager for detecting power failures, an interrupt handler for responsively incrementing a counter device, service routines which register to receive notification of the power failure, and a processor for evaluating the counter and providing notification of the power failure to the service routines which then assist the digital camera to recover from the power failure" (Anderson2, Abstract). However, as discussed above Anderson2 does not teach or suggest different compression

techniques operating on prioritized threads in a digital camera device that supports a multi-threaded execution environment.

Therefore, Anderson2 fails remedy the shortcomings of Li and Anderson1 discussed above with respect to claims 1 and 41. Claims 3, 4, and 11 include the limitations of claim 1 by virtue of being dependent on claim 1. Claims 43 and 44 include the limitations of claim 41 by virtue of being dependent on claim 41.

Therefore, claims 3-4, 11, and 43-44 are patentable over the combination of Li, Anderson1, and Anderson2 for at least the reasons articulated with respect to claim 1 and 41, respectively.

The Examiner rejected claims 8-10, 14, 40, and 48-51 under 35 U.S.C. §103(a) as being unpatentable over Li in view of Anderson1, and further in view of U.S. Patent No. 6,104,430 (hereinafter "Fukuoka").

Fukuoka discloses "a digital electronic camera which can accept various types of input/output cards or memory cards" (Fukuoka, Abstract). However, Fukuoka does not discuss compression, or compression modules.

Therefore, Fukuoka fails remedy the shortcomings of Li and Anderson1 discussed above with respect to claims 1 and 41. Claims 8-10, 14, and 40 include the limitations of claim 1 by virtue of being dependent on claim 1. Claims 48-51 include the limitations of claim 41 by virtue of being dependent on claim 41. Therefore, claims 8-10, 14, 40, and 48-51 are patentable over the combination of Li, Anderson1, and Fukuoka for at least the reasons articulated above with respect to claims 1 and 41, respectively.

The Examiner rejected claims 22-23, 25-26, and 36-37 under 35 U.S.C. § 103(a) as being unpatentable over Li in view of Anderson1, and further in view of U.S. Patent No. 6,154,493 (hereinafter "Acharya1").

Acharya1 discloses "a method that includes splitting raw image data into a plurality of channels including color plane difference channels, and then compressing separately each of these channels using a two-dimensional discrete wavelet transform" (Acharya1, Abstract). However, Acharya1 does not discuss different compression techniques operating on prioritized threads in a digital camera device that supports a multi-threaded execution environment.

Therefore, Acharya1 fails to remedy the shortcomings of Li and Anderson1 discussed above with respect to claims 1 and 41. Claims 22-23, 25-26, and 36-37 include the limitations of claim 1 by virtue of being dependent on claim 1. Therefore, claims 22-23, 25-26, and 36-37 are patentable over the combination of Li, Anderson1, and Acharya1 for at least the reasons articulated with respect to claim 1.

The Examiner rejected claims 27-28 and 35 under 35 U.S.C. §103(a) as being unpatentable over Li in view of Anderson1, and further in view of U.S. Patent No. 6,195,026 of Acharya (hereinafter "Acharya2").

Acharya2 discloses "A method comprising entropy encoding into bits a set of data values, and packing into storage the entropy encoded bits by reversing the bits of words with unknown length and keeping in blocks the words with known lengths. For instance, in an entropy encoded data set that uses both Huffman coding and zero run coding, the class code may be reversed in bit order from right to left rather left to right

while the words of known length such as the zero run code and Huffman pointer are stored left to right in blocks." (Acharya2, Abstract).

However, Acharya2 does not discuss different compression techniques operating on prioritized threads in a digital camera device that supports a multi-threaded execution environment.

Therefore, Acharya2 fails remedy the shortcomings of Li and Anderson1 discussed above with respect to claims 1 and 41. Claims 27-28 and 35 include the limitations of claim 1 by virtue of being dependent on claim 1. Therefore, claims 27-28 and 35 are patentable over the combination of Li, Anderson1, and Acharya2 for at least the reasons articulated with respect to claim 1.

If a telephone interview would expedite the prosecution of this application, the Examiner is invited to contact Judith Szepesi at (408) 720-8300.

If there are any additional charges/credits, please charge/credit our deposit account no. 02-2666.

Respectfully submitted,
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